

A-27

Cytochrome c Compressibility Measured with Two Synchrotron-based Techniques

Bogdan M. Leu¹, Ahmet Alatas¹, Harald Sinn², Hasan Yavas¹, Jiyong Zhao¹, Ercan E. Alp¹, Ayman Said¹, J. Timothy Sage³, and Wolfgang Sturhahn¹

¹Argonne National Laboratory, Advanced Photon Source, Argonne, IL 60439

²Deutsches Elektronen-Synchrotron, Hasylab, Hamburg, Germany

³Northeastern University, Boston, MA 02115

We used two synchrotron-based techniques (nuclear resonance vibrational spectroscopy and inelastic x-ray scattering) to measure the adiabatic compressibility of cytochrome c. Compressibility characterizes three interconnecting properties of a protein: dynamics, function, and structure. This is the first report of the compressibility of any material measured with this method. Unlike the methods previously used (which produced contradictory results) this novel approach probes the protein globally, at ambient pressure, does not require the separation of protein and solvent contributions to the total compressibility, and uses samples that contain the heme iron, as in the native state.